

An official in Ohio said on Sunday that the underground disposal of wastewater from natural-gas drilling operations would remain halted in the Youngstown area until scientists could analyze data from the most recent of a string of earthquakes there.

The latest quake, the 11th since mid-March, occurred Saturday afternoon and with a magnitude of 4.0 was the strongest yet. Like the others, it was centered near a well that has been used for the disposal of millions of gallons of brine and other waste liquids produced at natural-gas wells, mostly in Pennsylvania.

The waste, from the process called hydraulic fracturing that is used to unlock the gas from shale rock, had been injected under pressure into the well, which is 9,200 feet deep. Scientists had suspected that some of the wastewater might have migrated into deeper rock formations, allowing an ancient fault to slip. Similar links between disposal wells and earthquakes have been suspected in Arkansas and Texas.

Andy Ware, deputy director of the Ohio Department of Natural Resources, which regulates gas drilling and disposal wells, said the state asked on Friday that injection at the well be halted after analysis of the 10th earthquake, a 2.7-magnitude temblor on Dec. 24, showed that it occurred less than 2,000 feet below the well. Because of a lack of data, depth estimates of earlier earthquakes had been far less precise.

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